

Technical Memorandum
SWMU/AOC/OA-Specific
Data Presentation
RCRA Corrective Measures Study
Volume III

Boeing Plant 2
Seattle/Tukwila, Washington

Submitted to:

The Boeing Company
Seattle, Washington

April 2000

Submitted by:

Roy F. Weston, Inc.
700 Fifth Avenue
Suite 5700
Seattle, Washington 98104

WO 3709-034-500-0002

2.53 OA 21 BUILDING 2-44 MACHINE SHOP AREA

Background

OA 21 is an area of impacted soil in the north-central portion of Building 2-44 (Figure 2.53-1). During construction activities associated with installing new equipment in a machine shop located in this building, observations of staining and chemical odor in soil prompted the collection of subsurface soil samples. Fifteen stations were sampled within OA 21 to characterize the stained soil (WESTON 1995e). PCBs and oil-range petroleum hydrocarbon concentrations above RFI reference levels were detected at four sampling stations. The highest concentrations of PCBs and TPH were found near the east end of OA 21.

Approximately 120 cubic yards of impacted soil located in the eastern portion of OA 21 (the area where PCB and TPH concentrations were the highest) was removed and disposed of in accordance with applicable regulations. Subsequent soil sampling during the RFI was focused near the eastern end of OA 21 to characterize the soil that remained after excavation was completed.

The potential constituents of concern included PCBs and petroleum hydrocarbons.

Pertinent reference: RFI Work Plan Addendum #7, Machine Shop Area, Building 2-44. (WESTON 1995e).

Nature and Extent

Soil

During the RFI, soil samples were collected to define the nature and extent of constituents near the eastern portion of this unit. Eight borings (SB-04421 to SB-04428) were advanced within and to the southeast and the east of OA 21 during April, July, and August 1995 (Figure 2.53-2). The soil borings were within 50 feet of one another. A cross-section of the unit including four typical soil sampling stations is presented in Figure 2.53-3. Samples were collected from depths ranging from 1 to 10.5 feet bgs, and were analyzed for PCBs and TPH. The results of the soil analyses are presented in Table 2.53-1.

Concentrations of PCBs were above PMCLs in samples from three borings (SB-04422, -04425, and -04426) located near the eastern edge of the excavation. Aroclor 1248 was detected above its PMCL (33 µg/kg) in SB-04422 at 5 feet and 10 feet bgs, in SB-04425 at 7.5 feet bgs, and in SB-04426 at 6 feet bgs; the maximum concentration was 90,000 µg/kg in SB-04425. The 10-foot sample from SB-04422 also contained a single instance of Aroclor 1254 (3,000 µg/kg) and TPH (3,100 mg/kg). The TPH exceeded its PMCL (200 mg/kg).

Groundwater

Groundwater samples were collected from GP-04301, -04404, and -04405, at depths ranging from 15 feet to 27 feet bgs (Figure 2.53-1). GP-04404 was located on the eastern upgradient edge of the machine shop area, and GP-04405 was located just west (downgradient) of the area. GP-04301 was located about 130 feet downgradient, near Building 2-44's transformer vaults. Groundwater samples were collected in November 1994 and July 1995, and were analyzed for PCBs and TPH. The results of the groundwater analyses are presented in Table 2.53-2.

No PCBs or TPHs were detected in these groundwater samples.

Discussion

The nature and extent of constituents in the soil and groundwater have been adequately characterized from soil samples collected from eight borings and groundwater samples collected from three Geoprobe locations. The characterization is considered adequate for the following reasons:

- Soil samples were collected within the area of the former machine shop excavation, and to the south and east where constituents in soil would likely be found.
- The eight soil borings were located within 50 feet of one another.
- Soil samples were collected at elevations of 1 foot to 10.5 feet bgs, which covered the depth from just below ground surface to the water table.
- Soil samples were analyzed for the potential constituents of concern.
- Groundwater samples were collected immediately downgradient of the area.
- Groundwater samples were analyzed for PCBs and TPH which were the potential constituents of concern associated with this OA.

The results indicate that PCBs and TPH have impacted the soil. The extent of impacted soil appears to be localized to an area extending approximately 10 feet east of the machine pit excavation to a depth of 10 feet. Samples from borings to the south of the former excavation pit (SB-04421 and -04427) and to the north (SB-04424) did not contain constituents above the PMCLs. Therefore, the volume of impacted soil is limited.

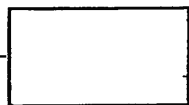
The results indicate no impact to groundwater at this unit.

The data are adequate for CMS purposes. The extent of impacted soil can be bounded to the north, south and east by SB-04424, -04421, and -04428 respectively. The western extent of impacted soil can be assumed, for CMS purposes, to extend a short distance beyond the western edge of the footprint of OA 21 where PCB concentrations are low (non-detect to 1.7 mg/kg, WESTON 1995e).

2-40

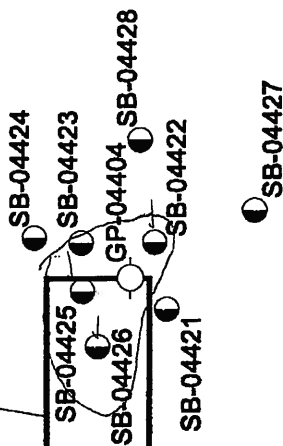
OA 21: Building 2-44 Machine Shop Area

OA 17



GP-04301

GP-04405

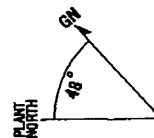


2-44

Groundwater Flow



Scale in Feet



2-44 Building Number

Geoprobe

Hand auger



OA 21: Building 2-44
Machine Shop Area

Figure

2.53-1

2-40

North Wall of Building 2-44

(R)

Approximate Excavation Limits

SB-04424

SB-04423

SB-04425

SB-04426

(A)

GP-04404

SB-04422

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

PCB

SB-04428

SB-04427

SB-04421

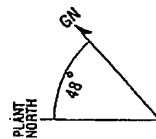
Okuma Foundation

2-44

GP-04301
Approximately
130'

Reference Drawing: 2-44-1S66

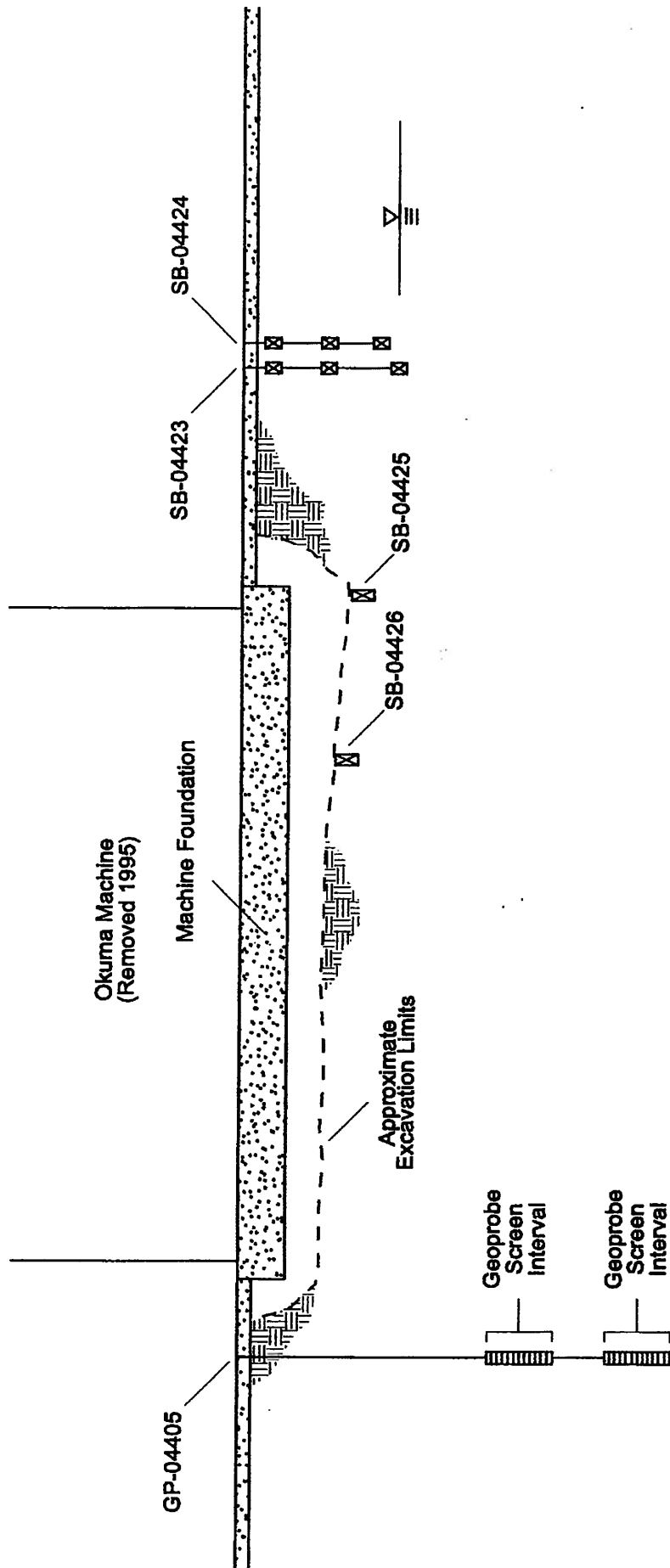
Scale: 1"=20'-0"



- 2-44 Building Number
- (S) Column Grid Identifier
- ◇ Geoprobe
- Hand auger



OA 21
Building 2-44 Machine Shop Area
Figure
2.53-2



SECTION A
Scale 3/32"=1'-0"

OA 21
Building 2-44 Machine Shop Area Section
Figure
2.53-3

- ☒ Sample Location
- △— Water Level (Varies)



Table 2.53-1 - Soil Report for OA 21 Building 2-44 Machine Shop Area

Constituent	Depth (ft bgs):	PMCL	Station ID:											
			Sample ID:		Sample Date:		Depth (ft bgs):		Sample ID:		Sample Date:		Depth (ft bgs):	
			SB-04421-0010	SB-04421-0055	SB-04421-0090	SB-04421-0020	SB-04422-0050	SB-04422-0020	SB-04422-0050	SB-04422-0020	SB-04422-0050	SB-04422-0020	SB-04422-0050	
Pesticides/PCBs (ug/kg)														
Aroclor 1016		33	35.0000U	45.0000U	53.0000U	37.0000U	37.0000U	80000.0000U						
Aroclor 1242		33	35.0000U	45.0000U	53.0000U	37.0000U	37.0000U	80000.0000U						
Aroclor 1248		33	35.0000U	45.0000U	53.0000U	37.0000U	37.0000U	85000.0000U						
Aroclor 1254		33	35.0000U	45.0000U	53.0000U	37.0000U	37.0000U	30000.0000U						
Aroclor 1260		33	35.0000U	45.0000U	53.0000U	37.0000U	37.0000U	4300.0000U						
Total PCB		33	35.0000UT	45.0000UT	53.0000UT	37.0000UT	37.0000UT	85000.0000U						
Total Petroleum Hydrocarbons (mg/kg)														
TPH by 418.1		200	11.0000U	30.0000	85.0000	13.0000	13.0000	72.0000						

A blank cell Indicates analysis was not performed. A boxed cell Indicates a result greater than PMCL. A shaded cell Indicates a detected result greater than PMCL.

Reproduction Codes: S0830SD.DBF - FIDIRel2.Inx Boxed Cells Standard:BP2PMCL2, Shaded Cells:DET-XCD

Table 2.53-1 - Soil Report for OA 21 Building 2-44 Machine Shop Area

Constituent	Station ID:		PMCL	SB-04422		SB-04423		SB-04423		SB-04423		SB-04424	
	Sample ID:	Sample Date:		SB-04422-0100	07/27/95	SB-04423-0010	07/27/95	SB-04423-0050	07/27/95	SB-04423-0095	07/27/95	SB-04424-0010	07/27/95
	Depth (ft bgs):			10		1		5		9.5		1	
Pesticides/PCBs (ug/kg)													
Aroclor 1016			33	19000.0000UI		37.0000U		39.0000U		45.0000U		35.0000U	
Aroclor 1242			33	20000.0000UI		37.0000U		39.0000U		45.0000U		35.0000U	
Aroclor 1248			33	15000.0000UI		37.0000U		39.0000U		45.0000U		35.0000U	
Aroclor 1254			33	5000.0000UI		37.0000U		39.0000U		45.0000U		35.0000U	
Aroclor 1260			33	430.0000UI		37.0000U		39.0000U		45.0000U		35.0000U	
Total PCB			33	2000.0000UI		37.0000U		39.0000U		45.0000U		35.0000U	
Total Petroleum Hydrocarbons (mg/kg)													
TPH by 418.1			200	5160.0000		11.0000U		12.0000U		13.0000U		32.0000	

A blank cell indicates analysis was not performed. A boxed cell indicates a result greater than PMCL. A shaded cell indicates a detected result greater than PMCL.

Table 2.53-1 - Soil Report for OA 21 Building 2-44 Machine Shop Area

Constituent	Station ID:	Sample ID:	Sample Date:	Depth (ft bgs):	PMCL	SB-04427					
						SB-04424	SB-04424-0050	SB-04424	SB-04425	SB-04426	SB-04427-0015
						07/27/95	07/27/95	07/27/95	04/20/95	04/20/95	08/23/95
						5	8.5	7.5	6	1.5	
Pesticides/PCBs (ug/kg)											
Aroclor 1016					33	35.0000U	41.0000U	9600.0000UI	400.0000UI	37.0000U	
Aroclor 1242					33	35.0000U	41.0000U	9600.0000UI	400.0000UI	37.0000U	
Aroclor 1248					33	35.0000U	41.0000U	9600.0000UI	2800.0000UI	37.0000U	
Aroclor 1254					33	35.0000U	41.0000U	4800.0000UI	200.0000UI	37.0000U	
Aroclor 1260					33	35.0000U	41.0000U	3800.0000UI	120.0000UI	37.0000U	
Total PCB					33	35.0000UT	41.0000UT	9600.0000UI	2800.0000UI	37.0000UT	
Total Petroleum Hydrocarbons (mg/kg)											
TPH by 418.1					200	10.0000U	15.0000			49.0000	

A blank cell indicates analysis was not performed. A boxed cell indicates a result greater than PMCL. A shaded cell indicates a detected result greater than PMCL.

Reproduction Codes: S0830SD.DBF - FID/Ref2.Inx Boxed Cells Standard:BP2PMCL2. Shaded Cells:DET-XCD

Table 2.53-1 - Soil Report for OA 21 Building 2-44 Machine Shop Area

Station ID:		PMCL	SB-04427		SB-04427		SB-04428		SB-04428		SB-04428	
Sample ID:			SB-04427-0070		SB-04427-0105		SB-04428-0010		SB-04428-0070		SB-04428-0100	
Sample Date:			08/23/95		08/23/95		08/23/95		08/23/95		08/23/95	
Depth (ft bgs):		7		10.5		1		7		10		
Constituent												
Pesticides/PCBs (ug/kg)												
Aroclor 1016		33	48.0000U	45.0000U	36.0000U	51.0000U	47.0000U					
Aroclor 1242		33	48.0000U	45.0000U	36.0000U	51.0000U	47.0000U					
Aroclor 1248		33	48.0000U	45.0000U	36.0000U	51.0000U	47.0000U					
Aroclor 1254		33	48.0000U	45.0000U	36.0000U	51.0000U	47.0000U					
Aroclor 1260		33	48.0000U	45.0000U	36.0000U	51.0000U	47.0000U					
Total PCB		33	48.0000UT	45.0000UT	36.0000UT	51.0000UT	47.0000UT					
Total Petroleum Hydrocarbons (mg/kg)												
TPH by 418.1	200	16.0000	13.0000U	20.0000	26.0000	14.0000U						

A blank cell indicates analysis was not performed. A boxed cell indicates a result greater than PMCL. A shaded cell indicates a detected result greater than PMCL.

Table 2.53-2 - Groundwater Report for OA 21 Building 2-44 Machine Shop Area

Station ID:			GP-04301	GP-04301	GP-04404	GP-04404	GP-04405
Sample ID:			GP-04301-0220	GP-04301-0270	GP-04404-0150	GP-04404-0250	GP-04405-0170
Sample Date:			11/16/94	11/16/94	07/26/95	07/26/95	07/15/95
Depth (ft bgs):			22	27	15	25	17
Constituent		PMCL					
Pesticides/PCBs (ug/l)							
Aroclor 1016		1	1.0000U	1.0000U		1.0000U	1.0000U
Aroclor 1242		1	1.0000U	1.0000U		1.0000U	1.0000U
Aroclor 1248		1	1.0000U	1.0000U		1.0000U	1.0000U
Aroclor 1254		1	1.0000U	1.0000U		1.0000U	1.0000U
Aroclor 1260		1	1.0000U	1.0000U		1.0000U	1.0000U
Total PCB		1	1.0000UT	1.0000UT		1.0000UT	1.0000UT
Total Petroleum Hydrocarbons (mg/l)							
TPH by 418.1		n/a	1.0000U	1.0000U		1.0000U	1.0000U
Conventional Parameters							
Conductivity (uS)		n/a			1039.0000	1039.0000	729.0000
pH (Field) (pH)		n/a			6.8300	6.8300	7.8600
Redox Potential (mV)		n/a			-8.0000	-8.0000	16.0000
Temperature (degC)		n/a			19.3000	19.3000	17.8000

A blank cell indicates analysis was not performed. A boxed cell indicates a result greater than PMCL. A shaded cell indicates a detected result greater than PMCL.

Reproduction Codes: W1410SD.DBF - FID1Ref2.Inr Boxed Cells Standard:BP2PMCLW, Shaded Cells:DET-XCD

Table 2.53-2 - Groundwater Report for OA 21 Building 2-44 Machine Shop Area

Station ID:		GP-04405	
Sample ID:		GP-04405-0250	
Sample Date:		07/15/95	
Constituent	Depth (ft bgs):	PMCL	25
Pesticides/PCBs (ug/l)			
Aroclor 1016		1	1.0000U
Aroclor 1242		1	1.0000U
Aroclor 1248		1	1.0000U
Aroclor 1254		1	1.0000U
Aroclor 1260		1	1.0000U
Total PCB		1	1.0000UT
Total Petroleum Hydrocarbons (mg/l)			
TPH by 418.1		n/a	1.0000U
Conventional Parameters			
Conductivity (uS)		n/a	728.0000
pH (Field) (pH)		n/a	7.8400
Redox Potential (mV)		n/a	21.0000
Temperature (degC)		n/a	17.3000

A blank cell indicates analysis was not performed. A boxed cell indicates a result greater than PMCL. A shaded cell indicates a detected result greater than PMCL.